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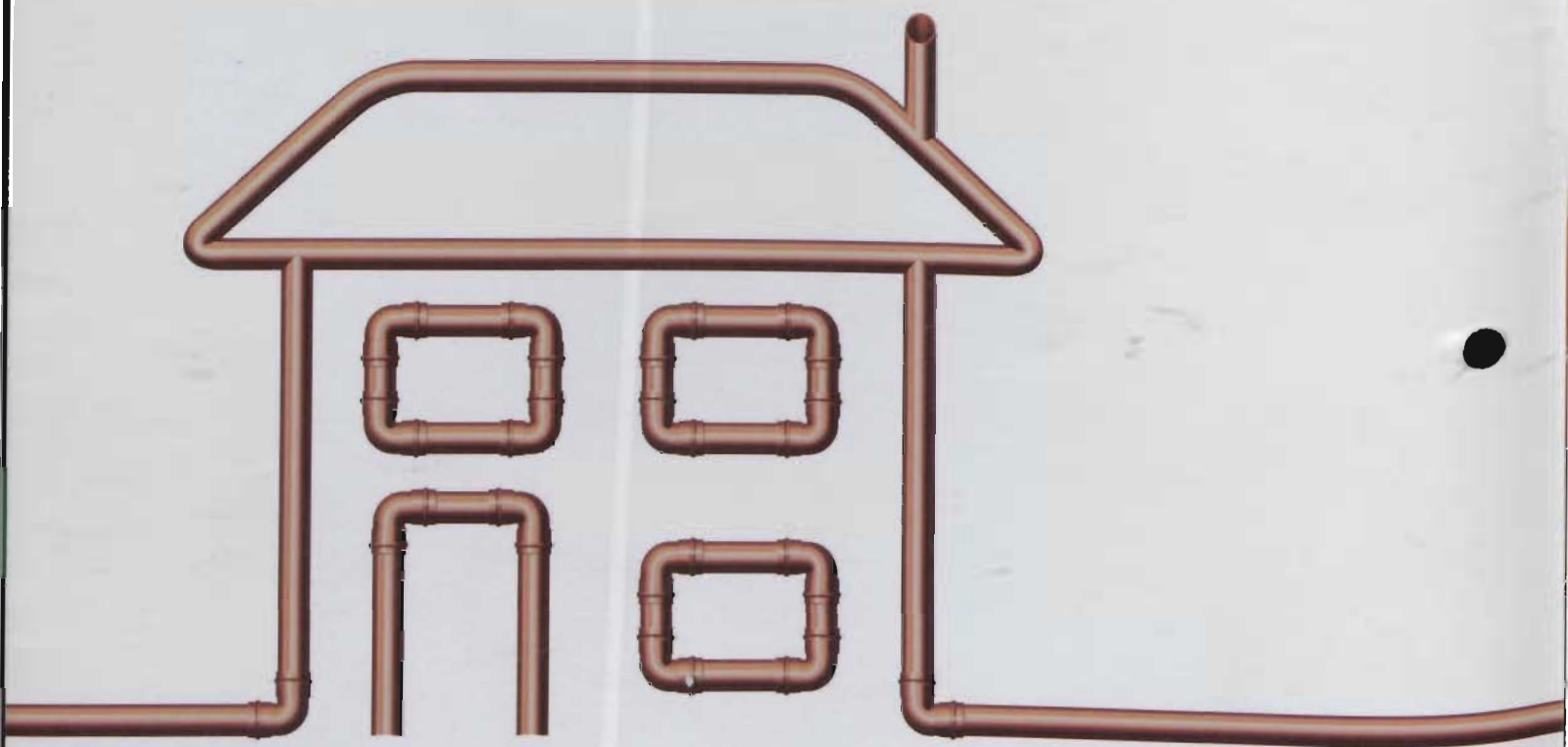


**From DIT Kevin St
to NASA**

Registration

*Why Market Choice
For Electrical
Contractors and
None For Gas
Installers?*

CIBSE Conference Review

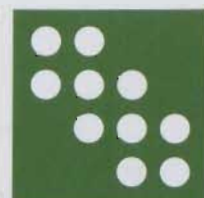


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opinion

Why Market Choice For Electrical Contractors and None For Gas Installers?

Gas installers throughout the country are up in arms at the moment because of the charges they fear will be levied in relation to the registration, subscription and certification of all gas works covered by the new statutory gas installer registration scheme.

All welcome and fully support the concept of a Register of Gas Installers, and the fact that there is one overseeing body, the Commission For Energy Regulation (CER).

However, the burning question of the moment is — why did the CER appoint two Electrical Safety Supervisory Bodies to oversee the registration, inspection, auditing and monitoring of electrical contractors and yet has appointed only one Gas Safety Supervisory Body?

The fact that there are two accredited Electrical Safety Supervisory Bodies gives electrical contractors a choice, something which is considered desirable in any open marketplace. This applies to all aspects of the service provided, not just the obvious one which is costs.

On the other hand, the fact that there is but the one accredited Gas Safety Supervisory Body means that the same choice is not available to gas installers. They are legally obliged to subscribe to the one monopoly stakeholder and, by definition, pay whatever charges are imposed.

Even going back nearly 20 years to the days of the voluntary registration of electrical contractors, the principle of there being but one body was successfully challenged. Was nothing learned from this experience?

Is it any wonder that gas installers throughout the country are now looking to this precedent and talking of setting up a supervisory body of their own. If such a body is established, and if it meets all the requirements as defined by the CER, will it be given Gas Safety Supervisory status?

trade news + product information

potterton myson complete controls pack

Potterton Myson Ireland has introduced the only complete controls pack offering to meet the SEI Home Energy Scheme grant criteria for installers. Myson, the only Irish manufacturer of controls, has assembled packs to include all items needed to meet this new business opportunity for installers.

These packs have been divided into four options-

- SEI One: Diverter valve option with hard wiring controls;
- SEI Two: Zone valve option with hard wiring controls;
- SEI Three: Diverter valve option with wireless controls;
- SEI Four: Zone valve option with wireless controls.

The packs enable the installer meet the SEI's requirement in the most efficient manner with the added advantage of the wireless options. "We will shortly offer training on the Myson range of controls and the SEI campaign. These training sessions will be available in the factory in Limerick, as well as our training centre in Whitestown Business Park in Tallaght", says Vincent Broderick, Sales Director, Potterton Myson Ireland.



"All installers are welcome to participate in this training, in addition to training on the extensive range of A-rated gas boilers in the Potterton range."

Contact: Sales Office, Potterton Myson Ireland. Tel: 01- 459 0870; email: post@potterton-myson.ie

nui galway degree in energy systems engineering

NUI Galway is to offer a new BE in Energy Systems Engineering. The new four-year honours degree will have its first intake this coming September and will produce professional accredited engineers, qualified to drive the emerging energy related-industries.

Graduates of the programme will be multi-disciplinary engineers equipped to solve problems across the whole spectrum of energy systems.

The programme will incorporate aspects of traditional civil, electrical and mechanical engineering, with an emphasis on energy policy, economics, environmental issues and a strong focus on informatics. The programme will include a range of additional optional modules.

The programmes will be available through the CAO in 2009 as a change of mind and announcements will be made to schools before the deadlines. They will be fully available through the CAO in 2010

itt to acquire laing GmbH

ITT Corporation has signed a definitive agreement to acquire Laing GmbH of Germany, a privately-held producer of energy-efficient circulator pumps primarily used in residential and commercial plumbing and heating, ventilating and air conditioning (HVAC) systems.

Once completed, the acquisition will significantly broaden ITT's offering and will reflect the company's continued strategic focus on satisfying the market's growing demand for energy efficiency and lower life-cycle costs.

"Laing's energy-efficient A-class circulator pumps are an ideal match for our own HVAC products for the building services market, particularly with our Lowara and Flygt brands in Europe and Bell & Gossett in the Americas," said Ken Napolitano, ITT's President of Residential and Commercial Water business.

The company expects to complete the transaction over the coming months, pending regulatory approval and customary closing conditions.



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trade news + product information

g&j engineering golf classic

G&J Engineering, established in 1992, hosted a golf classic recently in the South County Golf Club in which 25 golfers took part. Eric Hayward of Homan O'Brien claimed the first prize.

Based in Saggart, Co Dublin, G&J Engineering is a second-generation, family-owned and managed business with both George Larkin Snr and George Larkin Jnr dealing directly with clients.

The company employs a full team of plumbers, fitters, welders and technicians, all qualified and certified to the highest levels. Half the staff have been with the company for over ten years.

G&J Engineering has also devised a new corporate image which is now portrayed on its revised website, www.gjengineering.ie

Contact : George Larkin, G&J Engineering. Tel: 01 - 458 2010;
email : George@gjengineering.ie



George H Larkin presenting Eric Hayward of Homan O'Brien with his winner's prize.

energy master gains iso certification

Energy Master has been awarded the ISO Quality Certification for the design, supply and installation of renewable energy solutions and associated training.

Energy Master has been totally focussed on renewable energy since 1996 and is now one of the market leaders in renewable energy in Ireland, providing a range of high-quality heating, hot water and ventilation solutions for all types of applications.

"Quality assurance in Energy Master's products and processes is paramount to delivering sustainable solutions", says Tom Somers, Managing Director, Energy Master (right), "and this NSAI accreditation to ISO 9001:2008 formally acknowledges our ability to deliver sustainable heating, hot water and ventilation solutions to exacting standards".

Contact: www.EnergyMaster.ie



'honeywell thermostat breakthrough'

The new Honeywell DT90 range of digital room thermostats are claimed to be a breakthrough in home heating control which, in addition to cutting fuel bills and contributing to the environment, are also said to help prevent hypothermia among the elderly.

The DT90E and DT92E are wired and wireless versions of the same advanced thermostat, which is very easy to use and features a compact slimline design with an ultra-clear, extra-large digital display. Both are suitable for use with boilers, radiator and underfloor systems, electric heating and zoned heating systems.

The thermostats are also "intelligent" in that they have a self-learning facility which recognises how the heating system responds to its demand signals. They then adjust to adapt to the thermal characteristics of the building and the heating system to give better control.

Contact: Honeywell Home Comfort Controls.
Tel: 0044 1344 656511; email: literature@honeywell.com





Winner of
Japanese
Government
Award
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RAS-SX8

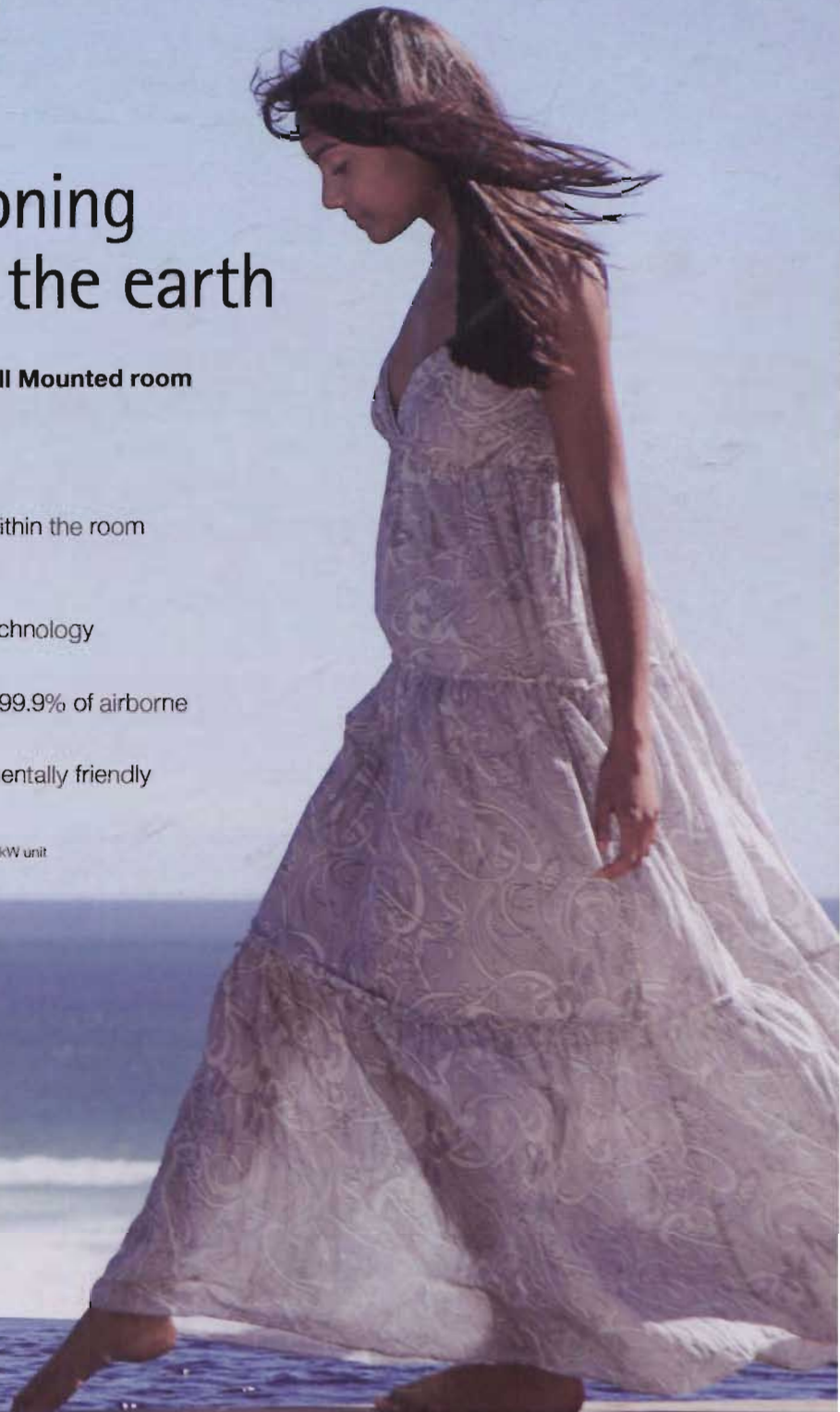
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trade news + product information

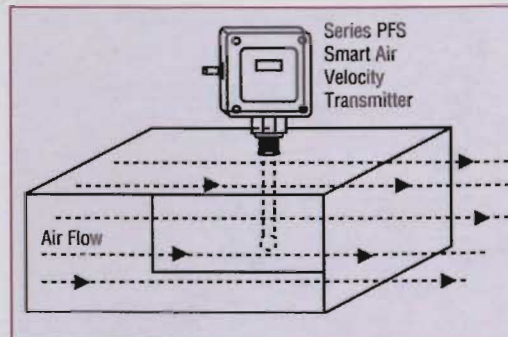
smart air velocity transmitter from manotherm

Installing air velocity measurement systems can be a complicated process, specifying pitot tubes, static pressure tips, orifice plates, differential pressure transmitters, etc. Manotherm now offers the PFS smart air velocity transmitter to consolidate these components into one convenient instrument.

The PFS can be easily installed into the duct or air stream to accurately measure airflow while providing local indication as well as linear analogue output. Microprocessor-based technology ensures accurate, repeatable results while state-of-the-art software allows for volumetric calculations and data-logging functions.

The PFS combines these features for simple, reliable airflow measurement without the problems associated with complex, traditional systems.

Contact: Bob Gilbert, Robert Gilbert or Conor Stead, Manotherm.
Tel: 01 - 452 2355; email: info@manotherm.ie



tour & anderson — get the balance right!

Tour and Andersson (TA) recently exhibited its range of hydronic balancing solutions at a leading regional heating, ventilating and air conditioning event at which it also provided delegates with a source of industry advice and information.

The event enabled TA address industry professionals on the benefits of using quality HVAC equipment with the continued support of a world-leading manufacturer of components. It also presented a variety of its balancing products, including its TBV and TBV-CM valves; STAP differential pressure controllers; and the TA-HUB central controlling system.

TA's terminal balancing valves (TBVs) provide professional hydronic balancing, delivering an efficient operation of small terminal valves. The TBV-CM modulating valve works in a similar way but has the added ability of providing a modulating control variable flow system.

The TA-HUB (Hydronic User-Friendly Balancing) is a completely bespoke system comprising a pre-insulated galvanised steel and aluminium unit. Within this is room for up to eight terminal units, complete with drain point, air vent, common measuring point and a flushing bypass.

STAP differential pressure controllers are used to stabilise the differential pressure across TBV-CMs. Differential pressure control allows circuits to work independently of each other so that a system can be extended or converted without having to re-balance any part of it.

Tour and Andersson's in-depth understanding of HVAC systems means it is possible to deliver a world-leading service to its customers, regardless of project specifications. By integrating TA's combination of controlling systems and valves, it is possible to create a bespoke system, to meet the specific needs of a building, on both large and small scale projects.

Contact: Ken Browne, Tour & Anderson (Ireland). Tel: 087 - 280 1095;
email: ken.browne@tourandanderson.co.uk



MYSON the made in Ireland brand

Built specifically to meet the SEI requirement for Ireland. A full range of standard and RF (Radio Frequency) controls, manufactured by Myson. All the controls come in one package and include easy to follow installation instructions. There are four variations to choose from, one to match every system up grade. So pick one up today... **Myson Controls - Made here for you.**

SEI Requirement. Minimum Standard

Two zone (space and water) with seven day programmer (time & temperature) control and boiler interlock. Time and temperature control of electric immersion heater and one more zone control or three TRV's

SEI ONE (Minimum requirement) DIVERTER VALVE OPTION

NO OFF	PRODUCT	CODE
one	Diverter Valve	MPE33/4DV
one	Two Channel Programmer	MEP2c
one	Cylinder Thermostat	MCT1
one	Room Thermostat	MRT1
one	Wiring Centre	MWB16
one	TRV's	PET1/2
three	Immersion Timer	

SEI THREE (Wireless Version) DIVERTER VALVE OPTION

NO OFF	PRODUCT	CODE
one	Diverter Valve	MPE33/4DV
one	Single Channel Programmer	MEP1c
one	Cylinder Thermostat	MCT1
one	RF Programmable Room Stat + Receiver	MPRTRF
one	Wiring Centre	MWB16
three	TRV's	PET1/2
one	Immersion Timer	

SEI TWO (Minimum requirement) DIVERTER VALVE OPTION

NO OFF	PRODUCT	CODE
two	Zone Valves	MPE23/4
one	Two Channel Programmer	MEP2c
one	Cylinder Thermostat	MCT1
one	Room Thermostat	MRT1
one	Wiring Centre	MWB16
three	TRV's	PET1/2
one	Immersion Timer	

SEI FOUR (Wireless Version) ZONE VALVE OPTION

NO OFF	PRODUCT	CODE
one	Diverter Valve	MPE33/4DV
one	Single Channel Programmer	MEP1c
one	Cylinder Thermostat	MCT1
one	RF Programmable room sat + receiver	MPRTRF
one	Wiring Centre	MWB16
three	TRV's	PET1/2
one	Immersion Timer	



heatingthroughinnovation.

Potterton Myson Ireland Ltd.

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Published by ARROW@TU Dublin, 2009

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Web: www.potterton-myson.ie

trade news + product information

free cooling from hitachi

The new Econofresh kit from Hitachi is an intelligent accessory device designed to provide up to 100% fresh air. Simple to install, it has the ability to deliver 4.8kW of "free cooling" through the damper when the outdoor temperature is below the indoor setting temperature.

This kit, when used in conjunction with the RPI in the ceiling system, will not only maintain the correct room temperature and provide fresh air, but also natural cooling, thereby increasing energy performance.

Fresh air cooling during intermediate seasons saves energy. This unit uses an economiser for cooling which takes in fresh air if the outdoor temperature is cooler than the indoor air. No compressor is used and so a significant amount of energy is saved.

The fresh air intake system keeps the air in the room clean at all times. The optical CO2 sensor can sense the degree of pollution of the air in the room and automatically controls the fresh air.

Utilising the free cooling potential of the Irish climate, the combination of the Econofresh and the RPI 5.OFSN2E can reduce the power input required by more than 20% when compared with a standard RPI 5.OFSN2E system.

Contact: Fergus Daly, Hitachi Europe (Dublin). Tel: 01 - 216 4406;
email: aircon.ireland@hitachi-eu.com

racgs season tees off at carlow gc

The first RACGS outing of the year was held in Carlow Golf Club recently with MSS as the main sponsor. The course was not at the usual high standard but it still produced good scoring on the day, a fact helped by the fantastic weather.

As always, winners were announced at the post-match meal with Sean Stenson from MSS on hand to present the prizes. Details were as follows:—

Overall winner

Johnny Lynagh (16), 37pts;

Class 1

Winner: Michael Clancy (13), 35pts; Runner-up: Joe Warren (13), 33pts;

Class 2

Winner: Billy Queally (16), 34pts; Runner-up: Mattie Kiely (16), 32pts;

Front 9

David Kirwan, 20pts;

Back 9

Jack Elstead, 18pts;

Visitor

Winner: Desy Haughton (14), 36pts; Runner up: Kieran Perry (10), 33pts.

refrigeration skillnet excel training

Refrigeration Skillnet has partnered with Direct Training Ireland to offer Microsoft Excel training at its training centre in Dublin. Courses will be provided at three levels — introductory, intermediate and advanced.

Refrigeration Skillnet members can avail of a very competitive special introductory offer of €125 per person for each of the different days. There is limited availability on all courses so early booking is advised.

See www.refrigerationskillnet.ie for full details.



Small change... huge effect



Domestic Energy Consumption*

The new Honeywell advanced DT90 and DT92 thermostats lead the way in energy efficient control. The advanced technology brings precision boiler control, maximising the energy efficiency of the heating system.

With heating and hot water accounting for over 80% of total household energy usage (and lighting 3%)*, you can demonstrate to your customers how to make real energy savings – and extra business for you.

DT90 and DT92 both work with TPI** control, resulting in up to 10%*** extra energy saving over a traditional room thermostat.

Available in wired or wireless models. Look out for details of the new advanced range and energy saving information at your local merchant.

Visit www.honeywelluk.com to find out more about TPI** or call 0044 800 521 121.

Honeywell

trade news + product information

kingspan water-saving technologies

KingspanWater is a new company established by the Kingspan Group PLC under the wing of its Kingspan Environmental Division. Its brief is to concentrate on the design, manufacture and supply of revolutionary new water conservation technologies to the construction industry.

According to Charles Burns, Commercial Director, Kingspan Environmental, water conservation technologies will play a significant role in the next wave of innovation in the construction industry and KingspanWater aims to be the leading name in the sector.

"Every year billions of gallons of useful water are flushed down the drain, because Irish homes and buildings have no mechanism for harvesting the rain that falls on the roof, or recycling the grey water that is used in showers, baths and dishwashers," says Burns.

"The average person uses an astonishing 150 litres of water per day. If the proper technologies are installed, this could be cut by up to 50% in a domestic property and 85% in a commercial installation," he concluded.

Contact: enquiry@kingspanwater.com



Charles Burns, Commercial Director, Kingspan Environmental at the launch of KingspanWater

sustainable energy awards 2009

Sustainable Energy Ireland (SEI) has commenced its annual search for Ireland's most energy-efficient businesses with the launch of the Sustainable Energy Awards 2009. The Awards are open to all businesses and span a range of sustainable energy categories, from employee awareness programmes to sustainable buildings and renewable energy.

Organised by SEI in association with ESB Customer Supply, the Awards recognise the achievements of Irish businesses who succeed in their efforts to cut energy costs and improve environmental performance. Entrants to the 2008 Awards demonstrated energy savings of over €17 million.

Professor Owen Lewis, Chief Executive, SEI, said: "All of our work with Irish business is proving that energy savings are available, often at low cost. It is clear that energy and money is being wasted. Many businesses are now acting to address this, but there is still plenty to do. Our Awards' winners show what is possible."

Deadline for receipt of nominations is Friday, 29 May 2009.

Contact: www.sei.ie/energyawards

way to go nicky!

As we went to press Nicky Martin's colleagues in Crossflow — and the huge number of friends he has throughout the entire industry — were planning a massive surprise party to mark the occasion of his retirement from the company.

The venue was the Sheldon Park Hotel, Kylemore Road, Dublin 12 with the date, Wednesday 22 April 2009, being all the more poignant as it is also Nicky's birthday (we won't say which one).

Drink, food and craic was the order on the evening with a surprise musical guest also on the programme. See next month's bs news for full report.



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CIBSE Conference Review by Tony Sung

'We Should All Be Proud To Be Building Services Engineers'

As is now customary, the *bs news* review of the CIBSE Republic of Ireland Region annual conference was entrusted to a leading industry figure and conference speaker. This year the task was undertaken by the eminent Professor Tony Sung, one of the industry's leading lights across all industry sectors, but especially in relation to sustainability. His report is as follows.

Late last month I attended the 2009 CIBSE Ireland National Conference at Clontarf Castle in Dublin and was immediately struck by how well prepared the organising committee were. Not surprisingly, the entire occasion ran very smoothly and was very well supported with something like 150 delegates participating on the day.

The topics presented were on sustainability, low carbon and high-energy performance buildings. The presentations included legislation and technology watch, case studies of sustainable buildings, use of SBEM software, and many

innovative techniques and solutions.

After Chairman Gerard Keating's warm welcome to the delegates and thank you to the many sponsors, Dr Kevin Kelly chaired the opening session.

First to the rostrum was Kevin O'Rourke, Head of Built Environment at SEI. He provided a comprehensive overview on various issues that will have significant influence on the delivery of sustainable buildings. Such was the scope and extent of his address that it would be impossible to relate it all in the space available here.

I would urge everyone to get hold of the memory stick issued to all conference delegates which contains his paper, and indeed that of the other speakers, along with very informative schematics and other illustrations.

The most important point I personally gained from Kevin's presentation was the fact that there are many players in the

arena to make sustainable buildings a reality for the world. As CIBSE professional engineers we should be proud of being a unique group of professionals who, on a daily basis, produce outputs directly contributing to making buildings more sustainable and helping others to reduce their carbon footprint.

Ciaran O'Connor, Assistant Principal Architect at the Office of Public Works, was next up. He gave a number of exemplar buildings that meet the definition of "sustainable buildings" and demonstrated in two slides I found both humorous, but true, that if the regulator, client, architect and services engineer all work to the same goal with complete transparency and a less confrontational approach, the sustainable goal can be met easier.

In both his presentation and demeanour Ciaran also come across as someone who should be a member of CIBSE and not just the RIAI, as he probably knows a lot more about building services engineering than me!

The third speaker was Martin Vaughan, Assistant Principal of Building Standards, Environment, Heritage and Local Government. He gave a good presentation of the requirements of Part L, the importance of BER and the timeline of Ireland's Building Regulations from a Regulator's perspective. In addition to the timeline, I found two of his BER slides to be extremely useful — with just these two slides I can explain to others what BER



Michael McDonald and Padraic Davis (speakers) with Derek Mowlds (Session Chairman), Ger Keating, Chairman CIBSE Republic of Ireland Region, and Professor Tony Sung and James Keillor (speakers).

CIBSE Conference Review by Tony Sung



Kevin O'Rourke (speaker) with Kevin Kelly (Session Chairman), Ger Keating, Chairman CIBSE Republic of Ireland Region, and Martin Vaughan and Ciaran O'Connor (speakers).

means and how it is derived. Once again I urge you to get hold of that conference memory stick.

The fourth and fifth speakers were Jason Gardner and Dr Ken Beattie. Due to lack of time in relation to the topics being dealt with, both presentations suffered from the speakers having to rush through the presentation. Ken had a bit of an additional problem in running the SBEM software demo and I think it could be useful if a demo slideshow was used rather than the actual software during such presentations.

I found Jason's flowchart of carbon mitigation design process very useful for sustainable buildings design planning, while Ken also confirmed that building regulations permit the use of other approved software for evaluating the energy performance of buildings.

In Session 3, Jim Keillor, Technical Manager of NG Bailey, presented the case study of Solais House, Scottish Divisional Headquarters of NG Bailey. The building has successfully adopted the use of low carbon and renewable technologies such as:

- Light wells and natural ventilation strategies;
- Underfloor heating and chill-beam;

- GRP ceiling and panel walls embedded with phase-change-materials (the Data Server Room does not require any mechanical ventilation system);
- Open loop ground source (water) heat pump for heating and cooling supply;
- Solar energy use (PV and thermal collectors);
- Intelligent BEMS;
- BREEAM scoring items.

Solais House has achieved BREEAM Excellent and EPC Grade 'A' ratings. Jim shared his living-in experience at the Solais House with the delegates.

Michael MacDonald of Jacob Engineering presented "Maintaining energy design intent under design and build frameworks". He has rightly pointed out that quite often the client doesn't really know what



"energy design" means in terms of EBPD and Building Regulations context. Once again I found his slides a good reflection and set of pointers.

Padraic Davis of Davis Associates presented the "Development of an Energy Consumption Index for Buildings". In summary, it is a simple tool which can be understood and used by a non-technical audience.

The format of the Index draws attention to the relationship between building design, building energy systems and energy consumption. It sets out energy consumption costs for a variety of building types in simple tabular form. In practical applications terms, the Index is used by building procurers to assist in the cost/benefit evaluation of passive and active design features in new-build and refurbishment building projects.

I think the idea of such an index



Jason Gardner (speaker) with Ger Keating, Chairman CIBSE Republic of Ireland Region, Ms Margaret Dolan (Session Chairman) and Dr Ken Beattie (speaker).

CIBSE Conference Review by Tony Sung

'We Should All Be Proud To Be Building Services Engineers'



Tony McKinley (Session Chairman) with Mark Coyne and Ms Jacqueline Balian (speakers), Ger Keating, Chairman CIBSE Republic of Ireland Region, and Karol Kerrane (speaker)

is very sound but it will require the capturing of a large sample of energy data from a significant number of buildings. Now that the Building Regulations demand mandatory metering, and given enough time, it is possible to gather the data from the buildings to realise the index in a few years time.

It will be worth piloting the index with a few buildings to explore how best the format of the index should take and how it can be used by the key players of sustainable buildings development.

In Session 4, Karol Kerrane of NEA presented the energy assessment procedures (NEAP), the importance of air-tightness, and how to manage Post Occupancy Evaluation (POE). It could be seen vividly from the graphs presented by Karol that air-tightness plays a vital role in energy use and CO₂ emissions in buildings.

I particularly liked the two final slides which showed the usefulness of POE. It can help

the building services engineer to identify where energy can leak out and design the problem out in the next project.

The next speaker was Mark Coyne of Dalkia whose paper was entitled "Energy Management within the Role of Facility Manager". I was delighted to listen to Mark advocating designing a building, not just for its functional requirements but also to cater for the maintenance needs to deliver long-term sustainable benefits to the client.

I agree wholeheartedly that if maintenance or FM specialists were being engaged at the design stage, it would help the client in the long run to not just save money but also to manage his carbon profile much more effective and efficiently.

Last but not least, we had a special speaker from CIBSE Headquarters — Jacqueline Balian, MD of CIBSE Services. Her presentation was on "Accreditation for commercial energy certification in Ireland". Although the world is in a

recession at the moment, Jacqueline injected a certain amount of confidence in the future by urging engineers to become accredited to issue BERs in relation to commercial buildings. Coincidentally, a feature-length article on the matter is included in this issue of *bs news* (see page 30), so I'll leave it to you to judge for yourself.

There were many questions from the floor after each session and it was to the credit of the delegates that they were all very attentive to all the presentations. One of the questions that I thought worth noting (and that more research should be devoted to it) was: "for existing buildings, how will BEMS impact the reduction of CO₂ emissions in these buildings?" I definitely agree with Kevin O'Rourke's response that smart buildings will have a lot to offer to reduce CO₂ emissions in these buildings, but also concur with Ciaran O'Connor's point that these so-called smart solutions have to be made simple.

In conclusion, it is very difficult to relate in full the benefit of attending conferences such as this. However, one thing is sure — as building services engineers we are at the forefront of the drive to reduce CO₂ emissions in buildings. By taking part in conferences and seminars such as this, delegates and speakers alike all contribute to a higher success rate in lowering energy use and reducing emissions of green house gases from buildings we dealt with. We should all be proud to be building services engineers.

From DIT Kevin Street to NASA



Dr Marek Rebow, Head of Research in the Engineering Faculty, DIT with Gabriel Byrne, Fantasy Lights Group; Patrick Crowley; and Keith Sunderland and Kevin O'Connell, DIT Kevin Street

Kevin O'Connell and his colleagues in DIT Kevin St are rightly proud of the calibre of graduate they turn out but, even they must have been surprised when Patrick Crowley, winner of the SLL Medal for Excellence at the joint CIBSE/DIT Student Awards last December, got accepted on to the Space Studies Program run by the International Space University in NASA Ames in Silicon Valley, California, USA.

Patrick was made aware of the SLL competition by one of his lecturers – Tommy Nugent – on the electrical services engineering programme he is studying at the college.

For his final year Bachelor of Engineering Technology project, Patrick conducted research on photosynthesis and artificial lighting, a subject he was always extremely interested in as his father is a horticulturist. Under guidance from DIT Kevin St mentor mentor Keith Sunderland, and lecturers Kevin Kelly and Kevin O'Farrell, he researched this topic for his project.

The Young Lighter Competition (sponsored by Enlighten, part of the Fantasy Lights Group) offered him a focus for his project and the means of encouragement towards a specific deadline. His presentation and paper dealt with photosynthesis and the major factors that affect plant growth. It compared the sensitivity of the human eye to that of a selection of plants and outlined experimentation exploring the growth rates for a controlled experiment.

The paper further explained how photosynthesis occurs under artificial lighting and provided information about the types of artificial lighting which can be best employed for plant growth. A further in-depth understanding of plant growth under artificial lighting was provided by Dr Alan Hunter (Senior lecturer in agriculture and horticulture based in University College Dublin).

Two case studies were observed. The first outlined how grass growth in football stadiums can

be maximised during winter. With help from John Brady of the OPW, the second case study examined unwanted mould growth from artificial lighting in the Dunmore Caves in Co Kilkenny. While Patrick's research initially concerned growth rates from the perspective of how to best achieve desired results, he sees the latter area as something he aspires to investigate further.

Having won the Irish heat of the SLL Competition at the annual CIBSE event held in DIT Kevin St, he subsequently participated in the Young Lighter Final at the ARC Show, in Earls Court, London. While he did not win, the SLL competition has already had a very positive influence in that diverse opportunities have been presented to him.

Not least of these was an approach by Dr Marek Rebow, Head of Research in the Engineering Faculty of DIT, who suggested that Patrick get involved in a future research project on growing plants ... in space! As a result of this he got accepted on to the Space Studies Program run by the International Space University held in NASA Ames in Silicon Valley, California, USA.

Patrick enthuses: "In the summer of 2007 I was working as an electrician on a building site in Dublin. In the summer of 2009 I will be studying in NASA Ames research centre in California. It is unimaginable thinking back, but it just shows that by taking little steps in life, bigger opportunities can be created".

CAREL in Ireland is ...

In the context of modern-day building services, energy and the environment are now firmly to the forefront as the critical factors governing system design. Whether it is refrigeration, humidification or HVAC, integrated control solutions are essential to ensure optimum performance and regulatory compliance.

To that end Carel Ireland, established just 12 months ago, is now emerging as the brand of choice of consulting engineers, installers, OEMs and end-users alike throughout the island of Ireland. An affiliate company of the multi-national Carel Group, Carel Ireland is a wholly-owned Irish company headed up by Dave Killalea, Managing Director, and Leslie Mason, Sales Director. Between them they have almost 60 years experience in the industry.

Widely known and respected throughout all sectors of the industry — Dave and Leslie's strengths are complemented by the design, software development and commissioning skills of their colleague Clinton Pratt, who brings another 18 years of dedicated industry experience to the company.

This collective strength, coupled with the vast scope of the Carel product portfolio and the technical resources it places at the disposal of Carel Ireland, is what sets the company apart from its competitors.

Completing the package is the manner in which the proposed solution is identified and delivered ... ultra-professional at all times, yet also flexible and user-friendly.



Clinton Pratt, Onsite Commissioning & Software Development with Dave Killalea, Managing Director and Leslie Mason, Sales Director



Caroline Farrell, Office Manager

Ex-Stock Availability ... Without Premium Prices

With literally thousands of lines in the Carel product portfolio, ex-stock availability of the most common items is essential. To that end Carel Ireland endeavours to carry a stock of high-demand items at its central distribution warehouse in Ashbourne in order to enhance and support its network of nationwide customers.

With this just-in-time stock control programme, and based on client usage, Carel Ireland are building a network to ensure that all in-demand items are readily available at very competitive prices. Installers are assured that, no matter where they are located throughout the island of Ireland, a local supply source will be near to hand.

... CAREL Ireland

Dedicated Training Centre

Given the sophistication of the Carel product line-up and the scope of applications catered for, Carel Ireland has created a purpose-designed training centre at its headquarters in Ashbourne, Co Meath.

Within this facility and apart from video tuition, powerpoint presentations and face-to-face technical instruction, course participants gain hands-on experience of hard-wiring, programming and networking a wide range of controllers dedicated to their specific industry.



Multi-Interface Capability

Carel units are unique in that they are self-contained, multi-faceted control and monitoring units which can interface with most other proprietary makes of control packages and building management systems.

No matter what the application — be it refrigeration, humidification or HVAC — this feature is common across the entire range and one which benefits consultants, system designers and installers alike.

An added bonus is that with one simple-to-use control unit, end-users find it easy to operate and so gain the maximum return in terms of performance outputs and energy optimisation.

System Design & Technical Support

Given the broad-ranging experience and expertise of Carel Ireland personnel, optimum control solutions can be devised for all types of applications across the refrigeration, humidification and HVAC sectors.

Once a project-specific solution has been devised, full support and technical back-up is available to the installer, along with comprehensive commissioning advice and service support, where required.

Specialist Applications

A small selection of the control strategies available for specialist applications are:—

- Air conditioning systems
- Air handling units
- Coldrooms
- Compressor racks
- Heating installations
- Hydronic systems
- Precision air-conditioners
- Retail environment solutions
- Roof-top units
- Small, medium and large chillers

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designing BUILDING SERVICES

the design of a BMS for a pharmaceutical environment

In the March edition of *bs news*, the design and development of the BMS User Requirement Specification (URS)/Scope of Works (SOW) document was reviewed. The URS/SOW is a key document in setting out the design parameters for development of the BMS design documentation. This document also serves to communicate the scope of the BMS both within the investor organisation and to the architectural and engineering (A&E) contractor.

That article also discussed the nature of the interactions, pertaining to the BMS design, between the various discipline engineers on the A&E team, and also the interactions between the A&E team and the client.

This month's article will describe some of the more important design documents used to manage communication between the client and A&E firm on one side, and the BMS contractor on the other. Among the more important documents in this regard are the A&E Sequence Of Operation (SOO) document, network architecture drawing and the Input/Output (IO) list.

The article will also discuss the obligations of the BMS contractor during design, construction and commissioning project phases.

A&E Firm Sequence of Operation Document (SOO)

The SOO should contain enough design information to enable the BMS contractor to develop the Software Design Specification (SDS). At a minimum, the following headings should be included within the SOO — system start-up/shutdown; temperature/humidity/pressure/flow control strategies; room pressure monitoring/control; interlocks; alarms table; setpoints and failure modes.

SOOs should be produced for all systems controlled or monitored by the BMS, including HVAC and utility systems. In some instances the BMS will be used to monitor self-contained systems, for example chillers and boilers. A SOO should also be produced for these systems, describing the nature of the monitoring and including alarm management and/or trending as required.

If there are a number of identical AHU's, a typical SOO for one AHU could be explained in detail in line with the above headings.

The operation sequences for the remaining identical AHU systems can then be developed by the BMS contractor in their SDS document. All SOO documents should be reviewed and approved by the client before the BMS contractor starts to develop their SDS.

A&E Firm Network Architecture Drawing

Figure 1 shows a typical BMS network architecture drawing. The BMS network architecture drawing should show all BMS panels, their locations, panel numbers and what systems the panels control. All servers, operator work stations (OWS) and printers should also be shown. By identifying the quantity of panels, servers and OWS, the client's IT department will be able to quantify the required number of IP addresses and location of all IT network points in advance.

A&E Firm Input/Output (IO) List

The BMS IO list should identify all IO, both on the HVAC airflow and instrumentation diagrams (AF&ID), and on the utility process and instrumentation diagrams (P&ID). The BMS IO list should include the tag number, point descriptor, IO type,

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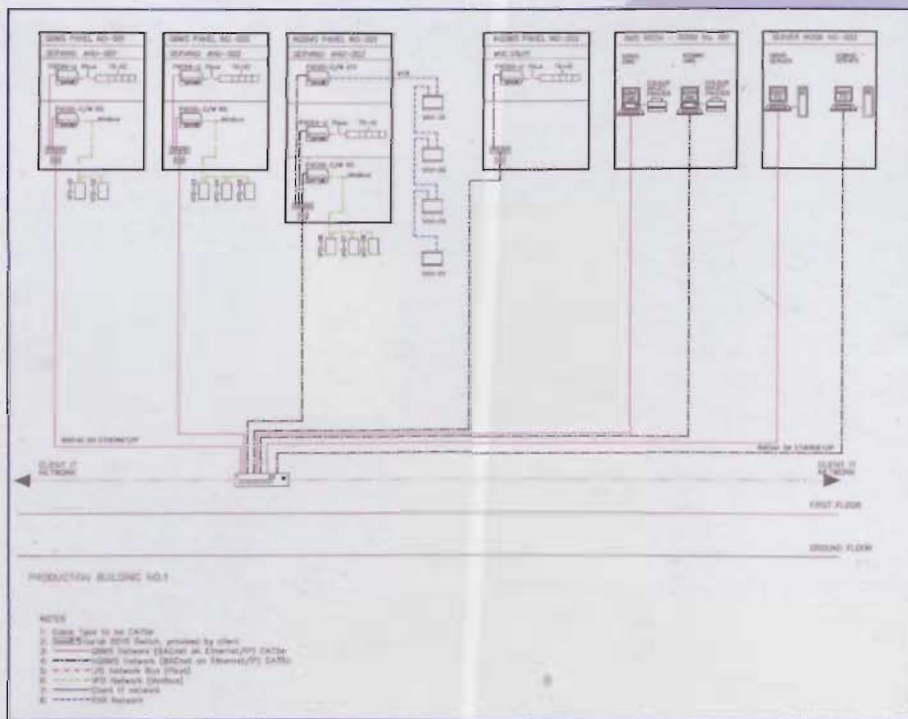


Figure 1: This shows a typical BMS network architecture drawing

instrument supplier and any additional comments which will assist the BMS contractor to complete the design.

During the project design phase the IO list must be updated so as to reflect the latest schematic AF&ID and P&ID revisions.

Identification of the correct instrument supplier is very important as instruments could be supplied by a number of sources including the BMS contractor, specialist vendors, skid manufacturers, etc. It may also be useful to identify who will install each of the instruments. Installers could include the piping contractor, ducting contractor, skid vendor, cleanroom contractor and/or electrical contractor.

BMS Vendor Deliverables

Figure 2 shows a typical basic framework for the specification and qualification of a BMS system using GAMP-based documents for the validation of automated systems.

Using this framework, the BMS contractor's document deliverables can be broken down into four sections – Hardware design specification/ panel manufacture; BMS network architecture layout; SDS/Code and graphics development; and commissioning and construction support.

Hardware Design Specification/ Panel Manufacture

The objective of this activity is to get BMS panels manufactured

and delivered to site on time. Two key milestones on the manufacturing schedule will be formal approval of input/output (IO) lists and panel schematics. The IO list development is driven by the latest version of the AF&ID's/P&ID's and IO list generated by the A&E firm. It is advantageous to develop an IO list per panel as this expedites the approval process.

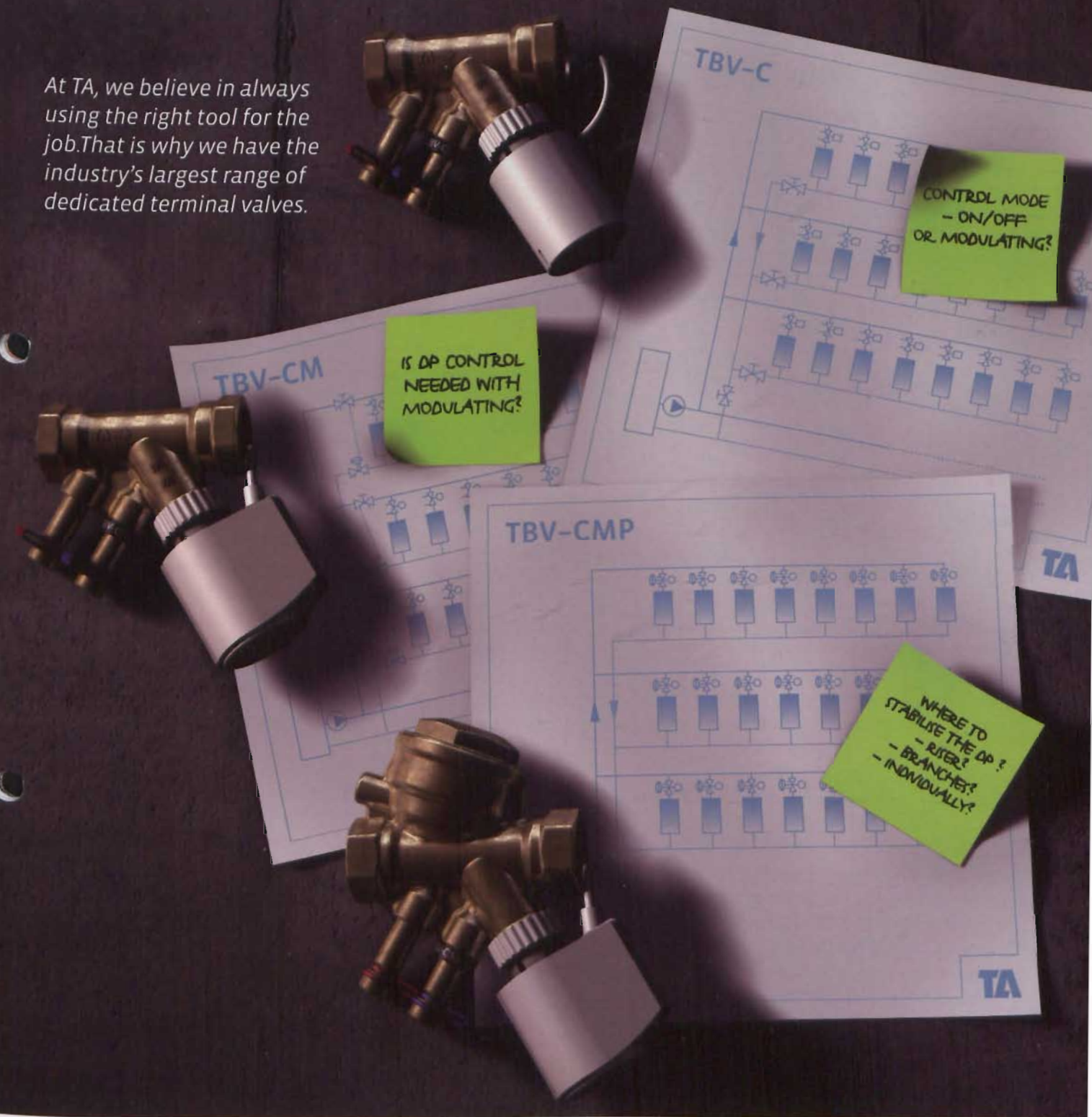
Once the IO list is approved for a panel, the panel schematics can be drafted up for that particular panel. The schematics should show a general arrangement (GA) of the internal layout of the panel. It should also show IO cards and addresses, IO terminal numbers, site termination details for each instrument, and all associated hard wired interlocks.

Once the panel schematic gets approved, the panel is now ready for manufacture. All specifications in relation to panel cabling colour, transformer make/model number, etc should be both communicated to, and adhered, by the panel manufacturer.

Additional, when IO lists are approved, instrument and valve schedules can be generated and submitted for approval. It is critical that the correct operational range for an instrument is selected. All instruments and valves should be reviewed and approved by the BMS, HVAC and instrumentation designers.

We'll never put a square peg in a round hole.

At TA, we believe in always using the right tool for the job. That is why we have the industry's largest range of dedicated terminal valves.



Hydronic systems are more effective when balanced correctly. Terminal valves adjust the flows to fit design condition, which together with proper control ensures that the hydronic system works the way it should. And because we understand that no two hydronic systems are the same, TA has developed the

industry's most comprehensive range of valves for small terminal units. And that's in addition to our huge array of balancing tools such as instruments, handbooks and software programs. In short, whatever the requirements of your hydronic system, we have what you need. Think balancing, think TA.

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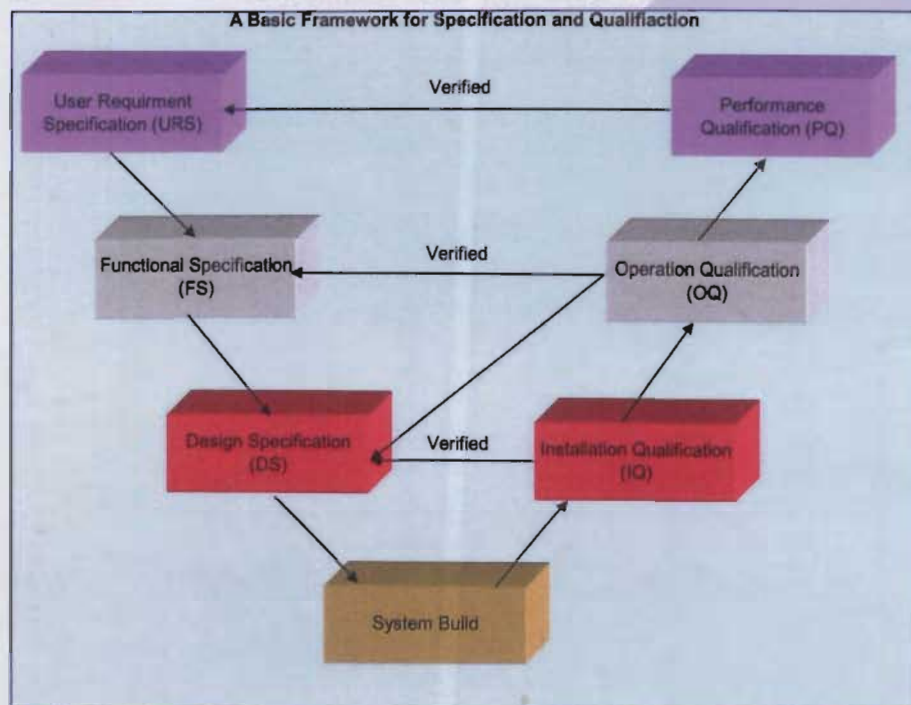


Figure 2: This shows a typical basic framework for the specification and qualification of a BMS system using GAMP-based documents for the validation of automated systems.

When all in-house testing of the panel is completed by the BMS contractor, the panel is offered to the client for testing off site. This is typically known as Hardware Factory Acceptance Testing (HFAT). This involves testing of the panel as per an approved HFAT document by simulating inputs, forcing outputs and proving interlocks. It should be noted here that the finished graphics are not necessarily required for this exercise.

Discrepancies in the panel should be documented in the HFAT testing document. Also, any error in the IO list/panel schematics need to be red-lined in the latest version of these documents. Once the panel has

successfully passed the HFAT, the panel can be released for shipment to site.

BMS Network Architecture Layout

This section covers the interface between the BMS hardware and the client's IT network. The BMS network architecture drawing should replicate what was in the A&E firm network architecture drawing, including all IP addresses of panels, servers and operator work stations (OWSs). In parallel, the BMS contractor should submit the Server/OWS and printer specifications for approval.

Once approved, the servers, OWS and printers need to be ordered and delivered to site for client network installation

Qualification/Operational Qualification (IQ/OQ) setup. Once network IQ/OQ is complete, the equipment is handed back to the BMS vendor for loading of the BMS software applications. The timing of these deliverables to site is vital for the project schedule. Without servers and OWS installed and operational, full loop checking of field instrumentation cannot start and therefore can result in a knock effect on the commissioning program.

Another important aspect of the file servers is system data backup and recovery tests. As the file server can be the main data historian on a project, the ability for the client to be able to back up data in the event of file server failure needs to be documented and approved. This is a crucial aspect of the file server operation and should be high on the client's priorities list for testing and approving.

SDS/Code & Graphics Development & Commissioning

The BMS vendor needs to produce a Software Design Specification (SDS) per system (each AHU and utility system). The SDS should expand what's detailed in the A&E SOO, including identification of all instrument tags and trending intervals. In essence, an engineer with no knowledge of the project should be in a position to read an SDS and review a set of AF&ID/P&ID and understand how the complete system will

the design of a BMS for a pharmaceutical environment

function in detail. If the SDS achieves this mark, it enables the BMS coding engineer to interpret the SDS and generate the next level of works – system code and graphics generation.

The URS should provide general direction on how the graphics should be laid out on the BMS OWS. But, in essence, the BMS graphics should resemble the AF&ID/P&ID. **Figure 3** shows a typical AHU graphic.



Figure 3: This shows a typical AHU graphic

When all in-house testing of code and graphics are completed by the BMS engineer, the system is offered to the client for testing off site. This is typically known as Software Factory Acceptance Testing (SFAT). This involves testing of the system as per the approved SDS by simulating inputs and forcing outputs. The simulation environment should also show the graphics in full dynamic mode. Note that the BMS panel is typically not required for this test and will often have already been delivered to site for installation at the time of the SFAT.

Any changes to code due to errors are documented in the SFAT testing document. Also, any mistakes/errors in the SDS need to be red-lined in the latest version of the SDS. Once the SFAT has successfully passed the test, the code and graphics for that particular system can be sent to site for loading onto the BMS panel CPU/BMS site platform.

After this point, the emphasis moves to site activities; instrumentation installation and wiring; and point-to-point checking by the electrical contractor. Once instruments point-to-point verification tests are successfully completed by the electrical contractor, the BMS vendor is in a position to start full-loop checking of instruments. This involves generating a signal at an instrument and recording the result displayed at the BMS OWS graphics.

When all instruments are fully looped-checked for a system, the final task is the execution of the pre-approved Site Acceptance Test (SAT) document for that system. For HVAC and black utility systems, this needs to be coordinated on site with the balancing contractor. Once the balancing contractor has finished balancing the relevant system, the system needs to be handed

over to the BMS vendor to first complete a "Pre-SAT".

A "Pre-SAT" is the first real opportunity for the BMS vendor to test and fine-tune the system. Once complete, the SAT can start. It is critical to the success of the SAT that close coordination with the other disciplines on site is undertaken in order to ensure the level of personnel, access and environmental controls are in place during the SAT execution. Once the SAT has successfully passed the test, final documentation needs to be handed over to the client for review and sign off. The client may use the full loop checks and the SAT to leverage or support some of the IQ & OQ activities

Construction Support

This section covers some of the documents required from the BMS vendor to enable construction of the project to proceed smoothly. The approval of the IO list enables a large quantity of construction-related

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documents to be generated. For example, for the electrical contractor to order correct quantities of cables and pneumatic tubing, the BMS vendor needs to produce cable and pneumatic tubing schedules.

From an instrument selection and approval aspect, it should be identified at an early stage if there are any long lead times for instruments. It can be a project decision to review the long lead items before IO lists are approved, so that this instrument type can be placed on order. For the majority of BMS instruments, long lead times are not an issue, but due diligence should always come first so that the installation schedule is not affected.

It is good practice that instruments purchased by the BMS vendor get delivered to the BMS vendor office for inspection, tagging and removal of the calibration certificate for storing. This activity is often referred to as Receipt Verification and is a key Good Engineering Practice (GEP) which can avoid unnecessary delays to the project schedule at a later stage. Once the BMS vendor has cleared the instrument fit for delivery to site, the correct quantity of instruments for a system should be delivered.

Delivery of the instruments to site should be on a Just-In-Time (JIT) basis to avoid misplacement by

the installation contractors. Misplacement of instruments has its own additional cost and can also have a knock-on affect on installation and commissioning schedules. The BMS contractor should be contractually responsible for providing training to the installers on the correct procedures for handling, installing and cable terminations for the instruments supplied under their scope. The BMS contractor should also be responsible for ensuring that all instruments supplied are installed correctly during their own walk-down procedures.

A recommended spares list should also be handed over to the client at project completion. This enables the client to make a decision on which instruments are required for on-site storage in the event of instrument failure.

Conclusion

From the outset of the project design, the BMS engineer needs to understand the client's requirements for the BMS system. By identifying the design criteria for the BMS, the URS/SOW document can be generated to capture the client's BMS requirements. Once developed, SOO, IO list and network architecture drawings need to be generated and approved. Once approved, the BMS contractor is in a position to start to develop the design deliverables. IO list agreement per panel is essential, as this one document allows numerous

other documents to be generated, i.e. panel schematics, instrument and valve schedules, cable/pneumatic schedules.

From a construction and commissioning aspect, the BMS contractor needs to be proactive, from identifying instrument locations on site through to answering any electrical issues such as instrument termination details, and to their own instrument walk-down procedure and punch-list management procedures. The above tasks will help to ensure that during full loop checks of instruments, that the instrument errors are reduced. SAT demonstration needs to be completed and witnessed on a system per system basis.

Finally, it is important that trending of control loops are attached to the SAT, to ensure that a system is controlling the temperature, humidity and pressure within the design control limits.

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- 2 – GAMP Guide for Validation of Automated Systems

Bibliography

Oliver O'Reilly is a lead BMS Project Engineer with PM Group. A graduate of Dundalk IT, Oliver has worked on a wide variety of projects from design, construction and commissioning in pharmaceutical and commercial industries in Ireland and the UK.

Delta EcoVee GT Sets New Filtration Standard

From modest beginnings in 1995, air filter manufacturer Delta Filtration has expanded and developed year on year to a point where it is now universally recognised as the leading producer of semi-finished and sub-assembly air filter products for heating, ventilation, and air conditioning applications.

In addition, finished products for end-users have been added to the Delta Filtration portfolio, such as panel filters and bag filters for ventilation systems, as well as gas turbine filters for power generation plants.

Most of its products are 100% synthetic, containing no glass fibre.

Delta Filtration has a massive international presence — exporting product to over 38 countries worldwide — and just recently added ACD Filtration Pte Ltd in Singapore as a new distributor to service its interests in that region of the world. In addition, Airfill srl, already a trading partner in Argentina, has signed a new agreement to distribute the newly-introduced Delta EcoVee GT rigid filter which is aimed at the gas turbine market.

Delta EcoVee GT is made from upgraded polypropylene, water-proofed, media and a heavy-duty pvc frame. In fact, it has already proven very successful in the South American gas turbine market and is now poised to make a similar impact here in Ireland.

Delta Filtration takes pride in providing the HVAC air filter industry, and end-users, with exactly what is needed. Its dedication to customer service means that top-quality products

are delivered on time, where needed.

Innovation and flexibility are other key strengths. Drawing on its expertise in ultrasonic welding and heat-sealing, it has designed and developed machinery in-house with high-speed production capabilities. With high-speed pleating machinery and two types of pocket manufacturing machines, it can dramatically reduce lead times.

"Delta Filtration is fully committed to providing the best possible quality in synthetic air filters to an ever-growing market", says Managing Director Donal McGoeey. "Developing next-generation products to meet both customer requirements and environmental needs has been, and continues to be, our prime concern. Our research and development department has devoted significant resources to achieve this.

"It is our policy to source only the best raw materials, and then to process them so that our

products do what they are meant to do. Our quality control department ensures superior quality and consistency. As an ISO 9000 registered company, each product manufactured in our state-of-the-art facility in Kilmallock undergoes rigorous inspection and testing to ensure the highest quality. We are actively interested in achieving customer satisfaction.

"If you are a producer of HVAC products such as bagfilters, pleated filters or panel filters then why not talk to us about what we can do for you. If you are the maintenance manager of a shopping mall, office complex, apartment block, or factory, and seek to find cost-effective and efficient filtration for your heating and ventilation systems, then Delta Filtration can provide what you need at a price that makes sense."

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ATC PIR Plates From Irish Fan Distributors

A

Irish Trade
Centre

International sells ATC products and services in the sustainable heating, ventilation and air conditioning (HVAC) market. It now has 12 companies in 11 countries, and strategic alliances in a further three countries — including Ireland where Irish Fan Distributors is the appointed trading partner.

Billy Wright, Managing Director, Irish Fan Distributors, says: "ATC is now one of the leading suppliers of heating, ventilation and air conditioning products in Europe with a vast portfolio of cutting-edge products catering for everything from air handling through to conditioning, humidifying, filtering, diffusion and fire safety.

"As ATC's trading partner in Ireland, we have access to the entire range of technologically-advanced products, in addition to the wealth of research resources and technical support which we tap into on a daily basis."

A typical example from the range is ATC's pre-insulated polyisocyanurate (PIR) rigid foam panels which are coated with centesimal aluminium foil on both sides. Technical specification is as follows:—

- Density 45 kg/m³;
- Thickness Aluminium : 80µm;
- Standard thickness is 20 mm;



PIR-A 2035 (ATC) — This latest and most advanced rigid foam panel from ATC is coated with centesimal foil on both sides

- Standard panel length is 2000 mm;
- Standard panel width is 1200 mm.

The pre-insulated PIR-ATC panels comprise sandwich-like panels consisting of two sheets of pure aluminum embossed with an insulated interior of Polyisocyanurate (PIR) foam, not PUR as is the case with most similar products.

These panels provide many advantages such as perfect air quality as the air is strictly only in contact with aluminum; very high insulation levels; completely sealed joints; and excellent fire resistance.

"A further advantage of these units", says Wright, "is the ease with which the material can be worked with. Anyone can be a manufacturer of rectangular ducts as it is more a case of assembling the ducts rather than constructing them. The tools are extremely simple (a few knives) and all one needs to do is to follow the instructions in the manual provided. With PIR-ATC panels you can forget about transporting large ducts to site and instead simply assemble them on site.

"To ensure ease of assembly we also have our own profiles, flanges and accessories. All are made from aluminum, meeting our high-quality standards which were devised to complement and match those of ATC."

The new PIR-ATC range of panels is suitable for the construction of duct systems for air distribution, heating, ventilation and air conditioning systems, and especially in applications requiring:—

- High hygiene capacities;
- Where ducting of fibre glass is traditionally used;
- Ducting of small and medium size;
- Low and medium-pressure levels;
- Normal insulation capacities;
- Visible installations;
- Little loading on the building structure.

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Ground-Breaking Sanyo CO2 Heat Pump

Sanyo has introduced a new carbon dioxide-based heat pump system which the company believes will transform the domestic heating industry.

The new refrigerant-based ECO technology uses an advanced air-to-water heat pump to deliver low-cost hot water for heating and domestic use in residential and small commercial premises. The technology is widely used in Japan and Scandinavia, where it is challenging the supremacy of the gas-fired boiler.

The self-contained refrigerant circuit contains CO₂, which is both natural and sustainable, and has a Global Warming Potential (GWP) of only 1. This is in comparison to HFC-based systems which traditionally have a higher GWP of 1300-1900. Although the HFC leakages from residential heat pump units are relatively small, it is regarded a better long-term solution to utilise working fluids that do not have any negative impact on the global environment.

Unlike other systems on the market, the carbon dioxide-based technology produces water up to 65°C, hot enough to be used directly in traditional radiators without the need for an inefficient electric booster heater, thereby keeping energy costs and emissions low.

It is the flagship product of a new heating sector business recently unveiled by Sanyo Air Conditioners. Headed by Vincent Mahony, it was established to drive forward and harness what the company believes is massive

market potential for its new market-leading heat pump technology in Ireland.

Vincent Mahony said: "The CO₂ ECO system sets a new benchmark for the industry in terms of sustainable technology that delivers. In any objective assessment of performance, it leaves the competition standing.

"The product opens up exciting new market opportunities for air installers looking to broaden the base of their business. It could help offset what will be a difficult year, especially for companies who rely on smaller air conditioning installations as their mainstream work."

The system is based on Sanyo's pioneering carbon dioxide-based compressor, claimed to be the world's first two-stage rotary compressor operating on R744. Able to operate at ambient temperatures as low as -25°C, the inverter-controlled, high-performance, direct-current unit delivers COPs of up to 3.75. The compressor is engineered to ensure effective load dispersion and accommodates the high pressures generated by carbon dioxide to virtually eliminate the risk of leaks.

The system consists of an outdoor heat pump unit, containing the compressor and refrigerant circuit, linked to an indoor unit containing a heat exchanger and hot water tank. It supplies domestic hot water and can be directly connected to

radiators or an underfloor system for space heating. It is claimed to produce around 50% less carbon emissions than comparable gas-fired boilers.

Alongside the CO₂-based ECO system, Sanyo has also introduced an advanced HFC-based heat pump system, further expanding the offering. Available in capacities from 5kW to 28kW, the system is designed for both heating and cooling and can be used with traditional fan coil units. The split system comprises an outdoor unit linked to an indoor hydrobox, complete with pump, controls and back-up heater. The HFC-based system is being targeted at mainstream applications where the exceptional performance of the ECO system is not required.

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derating power cables to take account of harmonics(part 2)

The first article on this topic was published in the November issue of the *bs news*. It noted that the current ETCI Rules and the 17th edition of the IEE Wiring Regulations (BS 7671:2008) require that due account is taken of harmonic loading when selecting electric cables. It went on to show that the neutral current in an apparently-balanced load can be significantly greater than the line currents. This can lead to voltage distortion and serious overheating of the cables, leading to possible failure.

Effects of Overloading Cables

In less extreme cases the current in the neutral in a balanced three-phase system may not exceed the line currents but may, nonetheless, add significantly to the operating temperature of the cable, causing it to operate at a higher temperature than designed. This may not lead to failure in all cases but will reduce the life of the cable. Data released by cable manufacturers' states that the service life (normally 25 years) of a cable reduces by 50% if the operating temperature is 8°C above its rated value.

Consider a three-phase fully-loaded cable supplying a balanced load which is fully loaded. Suppose that the neutral current is equal to the line currents due to the presence of harmonics. All four cable conductors now

become heat emitters and the heat generated by the cable will have increased by 33% compared to a cable with only three loaded conductors. The operating temperature of the cable above ambient temperature is directly proportional to the heat generated in the cable.

Therefore, taking normal ambient temperature of 30°C and 70°C as normal operating temperature when fully loaded, the temperature of the cable will increase by $40 \times 0.33 = 13.2^\circ\text{C}$. Thus the operating temperature of the cable in this case will be $70 + 13.2 = 83.2^\circ\text{C}$. This cable may or may not fail in service but its lifespan will be reduced by more than 50%

Application of Appendix 11

The main points covered in Appendix 11 are as follows:—

— Appendix 11 of BS 7671:2008 is intended to cover the situation where there is current flowing in the neutral of a balanced three-phase cable. This effect is caused by Triple-N harmonics, the most significant of which is usually the third harmonic. It is recognised that the situation is more onerous if only two of the three phases are loaded. In this case the neutral conductor will carry the out-of-balance current in addition to the harmonic currents. Where there is an

imbalance of more than 50% between phases, then lower reduction factors may be applicable*;

- The reduction factors given in Appendix 11 only apply to cables where the neutral conductor is within 4- or 5-core cables where all conductors have the same CSA. They are based only on third harmonic currents. If there are significant higher harmonics (more than 10%) present, then lower reduction factors are applicable*;
- Where the neutral current is higher than the line conductors, the cable size should be selected on the basis of the neutral current*;
- Where the cable size is based on a neutral current which is not significantly higher than the line current, it will be necessary to reduce the tabulated current-carrying capacity of the line conductors;
- If the neutral current is more than 135% of the line current, the cable size is selected on the basis of the neutral current and no reduction factor need be applied*.

***17th edition of the IEE Wiring Regulations (BS 7671:2008)**

derating power cables to take account of harmonics(part 2)

Table 11 – Reduction factors for triple harmonic currents in four-core and five-core cables

Third harmonic content of line current	Reduction Factor	
	Size selection is based on line current	Size selection is based on neutral current
0-15	1.0	-
15-33	0.86	-
33-45	-	0.86
>45	-	1.0

Example:

Consider a three-phase circuit with a design load of 39A to be installed using four-core PVC insulated cable clipped to a wall, installation method C.

For the purposes of illustration, the following procedure is based only on current-carrying capacity and ignores voltage drop and other considerations.

From table 4D2A - 6 sq mm copper conductor cable (41A) is suitable.

If 20% third harmonics are present, then apply reduction factor 0.86 and the design load becomes $39/0.86 = 45.4A$. Therefore select 10 sq mm cable.

If 40% third harmonic is present, the cable size is based on the neutral current, which is: $39 \times 0.4 \times 3 = 46.8A$. Apply a reduction factor of 0.86 and the design load becomes $46.8/0.86 = 54.4A$. Therefore select 10 sq mm cable.

If 50% third harmonic is present, the cable size is based on the neutral current, which is: $39 \times 0.5 \times 3 = 58.5A$. Apply a rating factor of 1.0 and the design load becomes $46.8/0.86 = 58.5A$. Therefore select 16 sq mm cable.

Note: Appendix 11 recommends that for cables in excess of 50 sq mm that further allowance must be made for the skin and proximity effects which can be significant.

Kidnapped Foul-Mouthed Parrot Returned Safe



Mark Kiely of Gasco broke down in tears recently when his foul-mouthed parrot — kidnapped and held captive for nearly three weeks — was returned safely to his loving bosom just as we went to press.

Callers to Gasco's offices in Broomhill Road in Dublin have mixed feelings about the parrot, not least because of the foul-mouthed greeting delivered to everyone entering the premises.

A delighted Mark said he was just glad to have it back. He refused to comment on reports that a substantial ransom (lifetime membership of RACGS) was paid to the kidnapper.

**BER***Building Services News, Vol. 48, Iss. 3 [2009], Art. 1***BER****BER**

A Sustainable Future in Existing Buildings?

While the construction industry goes into hibernation, there is one area of potential work for design engineers which is set to expand substantially — the provision of building energy ratings for commercial premises which are being sold or let, writes Jacqueline Balian, Managing Director of CIBSE Certification.

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or design engineers with a social conscience, the work associated with providing Building Energy Ratings (BERs) to comply with European-inspired legislation not only holds the potential for continued employment throughout what is undeniably a rocky period, but also offers the chance to make a real contribution to reducing carbon emissions from existing buildings, by far the biggest source of carbon in the non-domestic arena.

Research in the wake of the introduction of a similar system in England and Wales reveals that client attitudes are profoundly affected by seeing an independent rating of their building. Over 80% of clients initially view BERs as a compliance issue and exert themselves only to get hold of a rating at the lowest possible price. However, once they see their grade and get their building's recommendations report, over 50% of clients say they will try to implement some of the energy-saving measures suggested.

This means that a competent building services engineer who can make cost-effective suggestions that will genuinely save clients money, will often find that providing a BER is just the start of a rewarding relationship in which implementing his recommendations benefits him, the client, and the climate.

BERs can only be produced by people with the right accreditation and SEI currently has an interim scheme in place for accreditation. Within the coming year this will be replaced by a full scheme. Under the interim scheme there are two ways for competent building services engineers to become accredited:—

- (1) Those with membership of a professional body and a degree in a building specialism can take an exam currently being run by BRE;
- (2) Anyone who is accredited by a UK accrediting body will also be accredited by SEI under the interim scheme.

For those who want to take the latter option, there is a good choice available as there will shortly be 21 UK accreditation bodies. By far the largest is CIBSE Certification which currently accredits half of all UK assessors.



Jacqueline Balian, Managing Director of CIBSE Certification



BER



et al: BS News

BER



BER

Energy assessors accredited by CIBSE are awarded the title Low Carbon Energy Assessors because CIBSE only accepts individuals with experience in the industry and additional training in low carbon design and operation of buildings.

This title allows CIBSE Low Carbon Energy Assessors to differentiate themselves in what is becoming a very crowded market, which is important as experience is often the deciding factor in contract placement.

To become accredited by CIBSE, you must have two years full-time equivalent experience within the last five of carrying out work such as providing design calculations or surveying services for buildings. You must demonstrate this experience by providing a personal statement and supporting information.

There is also a requirement to demonstrate your knowledge of the regulations and your expertise in the use of the calculation software by means of passing examinations.

The calculation software you will have to use is known as SBEM* and there is a specific version for Ireland. All energy assessors need to pass an examination in the use of software and this is available in the UK from UK software providers (a full list is available on the CIBSE Certification website www.cibsecertification.co.uk).

UK software companies train only in the UK version, so those who take training in the UK can be accredited under the interim arrangements, but they will probably have to take top-up training in the Ireland version of SBEM when the interim scheme comes to an end.

There is an alternative, however. Training will shortly be available from ELSOL based at the Dublin Institute of Technology which will cover both the Ireland and UK versions. Those who take this training will be qualified to work in Ireland, Northern Ireland and England and Wales under the CIBSE scheme.

To be accredited by CIBSE you also have to pass a two-day training course in the legislation which is provided in Ireland with the first courses taking place in mid-June.

Cost is a major consideration for those thinking of embarking on a new area of work, particularly in the current climate. The full cost of accreditation through CIBSE, using the ELSOL and CIBSE training, is €1750. This includes an annual registration fee of €300 euros, and €100 euros for accreditation, by SEI. Meanwhile, the current charge for accreditation via the BRE training and examination is €1800.

The other major consideration is: what is the size of the market? In the UK there were expected to be 140,000 EPCs

lodged every year. This level of lodgements has not been realised in practice because of the recession but some 60,000 have been lodged in the last year.

The Irish market is smaller but it is expected that some 2,000 to 3,000 certificates may be needed in view of the much-reduced property transaction profile for this year. Around 300 full-time equivalent assessors are estimated to be needed to meet demand overall.

So, what will happen when the full scheme takes over from the interim scheme? CIBSE is working closely with SEI and anticipates that it has sufficiently future-proofed its accreditation and training mechanisms to ensure that all those accredited in Ireland will retain their accreditation under the full scheme without any further work.

Contact: Ratija Chitnavis, CIBSE Certification.

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**You also have the option to use dynamic simulation instead. Dynamic simulation modelling (DSM) is more often used for on-construction BERs as it requires more skill to operate and more data to be entered. Dynamic simulation may need to be used, however, for large, complex buildings which have large atria or solar shading for example. A version of the dynamic simulation system from IES, called IES-VE, will soon be available in Ireland.*

Plumb Lines

heard it on the grapevine ...



RYAN THE WONDER MAN!

Has anyone else noticed the avalanche of news bulletins and press releases being issued by Energy Minister Eamon Ryan in recent months? All claim that, with "his" many green initiatives, he is also single-handedly solving the employment crisis in the country.

No matter what the so-called green initiative there is always a convoluted twist to link it with job creation. Minister Ryan claims to be creating thousands of jobs while, at the same time, securing Ireland's energy future.

Just what planet is the man on?

GUESS WHO & WIN BOTTLE OF BUBBLY

Do you know who this upstanding industry representative is?

Clue No: 1 — They say that if the cap fits wear it it does and he is!

Clue No: 2 — He plays golf left-handed.

Email pat@pressline with your answer and go into the hat for a bottle of bubbly. Draw will take place on Friday, 15 May.



BER FIASCO PLUMBS NEW DEPTHS

You've just got to check out BerCert.com. This is a new website providing "a secure bidding arena for homeowners requiring a BER certificate", according to a release issued by the company.



The same release continues: "During the last seven days, BerCert.com has had almost 200 jobs posted, with almost 1,800 bids from assessors, in response. Of these bids the highest received was €750 for a 4-bed detached in Dublin, and the lowest €80 for a 1-Bed apartment."

According to Gerard Brady, co-founder of BerCert.com: "The huge price differential between the bid levels is indicative of the number of assessors currently in the market. While we do not believe that a price of €80 is sustainable for working assessors, it reflects the widely-held view that SEI has allowed the market become flooded. The supply side of the industry is currently over-subscribed, which represents excellent value for the consumer."

But does it? ... just what value is a cut-price BER Cert to the householder, not to mention the nation at large? Thanks to BerCert.com, there is now hard evidence to support what knowledgeable industry commentators have warned of all along.

HUMMER LESS DAMAGING THAN TOILET PAPER

Because of the virgin forests felled and the chemicals used in paper pulp manufacture, Greenpeace says that driving a Hummer is less damaging to the environment than using luxury soft-ply loo rolls.

Americans vote with their bums when it comes to the environment with more than 98% of loo rolls sold in the US made from virgin forest. Apparently, they prefer "the softness and strength that virgin fibres provide".



Europeans, on the other hand, are a little less discerning and have no great difficulty using toilet paper made from recycled products, which account for something like 60% of the total used. So, when next shopping for toilet paper, buy recycled and save a tree or two.

JENNY'S SHOE FUND APPEAL

It could only happen to a bunch of Irish building services guys! On a night out in Edinburgh recently a party of industry representatives were solicited by a very attractive young lady to contribute to her "graduation shoes fund".

Yes, the story is true but, to protect the innocence of those involved, I'm not at liberty to divulge the full story. Suffice it to say that sometimes fact is stranger than fiction!

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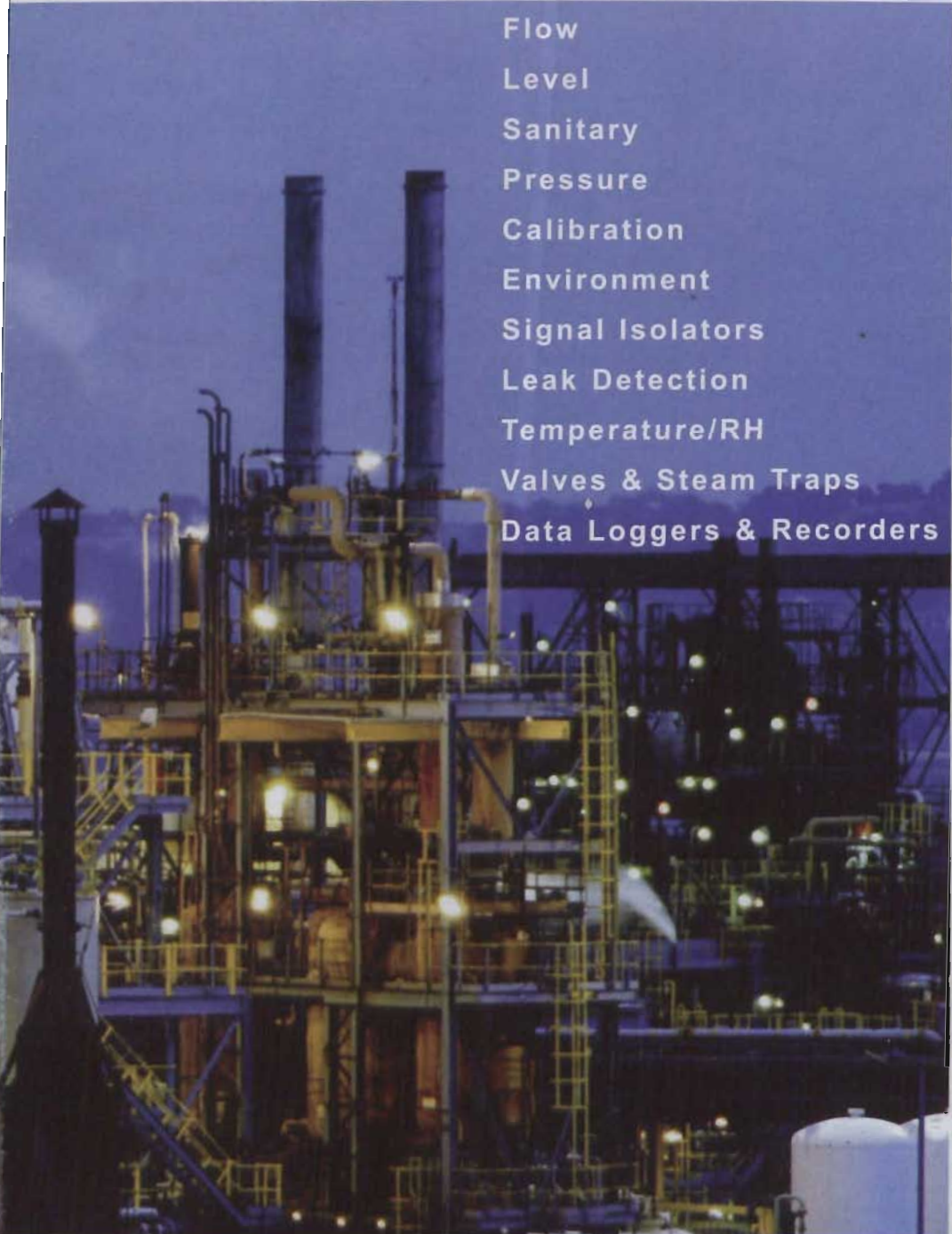
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Fit & Forget

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